THE NILE RESERVOIR.

An official memorandum upon the proposed modifications in the Assuan dam project has been drawn up by Mr. W. E. Garstin, C.M.G., Under-Secretary of State in the Egyptian Ministry of Public Works, and is published in Tuesday's *Times*. It will be remembered that an account of the schemes for the irrigation of Egypt was given in these columns a few months ago (vol. l. p. 80).

Several arguments have been brought against the Assuan cataract as the site for the dam. The first is that this site is not the only possible one to be found north of Wadi Halfa. The second, and, at first sight, the strongest, argument against the proposal is that it is impossible to lay down as an axiom that the Assuan cataract site is the only feasible one for a dam, while the river valley south of Wadi Halfa has been unexplored and unsurveyed.

Mr. Garstin criticises the arguments, and shows that the project proposed best meets the case. In this opinion he is supported by the English and Italian members of the Technical Commission—Sir Benjamin Baker and Signor Torricelli—who reported that there is only one safe site for a dam between Cairo and Wady Halfa, namely, the Assuan cataract. Subjoined is Mr. Garstin's description of the scheme. The careful consideration which has been given to the matter reflects great credit upon the Egyptian Government. Science is to be congratulated upon the action that has been taken; for the benefits that will accrue to it from the investigations which it is proposed to carry out over the whole of Nubia will be of the highest importance.

The Council of Ministers on June 3, 1894, approved in principle of the proposed dam and reservoir at the Assuan cataract, and directed the Ministry of Finance, when preparing the Budget for 1895, to occupy itself with the question of obtaining the funds necessary for the execution of this work.

The project, as then submitted to the Government, consisted of a dam with its crest at R.L. 114·00, which height would have enabled water to be stored in sufficient quantity for the requirements of Middle and Lower Egypt; in other words, for the whole country lying to the north of Assyut.

Most unfortunately the construction of this dam would have necessitated the submersion for some six months every year of the celebrated Philæ temples, as well as of a considerable number of Nubian monuments, which, although less known than those of Philæ, are of great importance to all those interested in the history of ancient Egypt.

The archæological societies of Europe, upon hearing of this proposal, protested against it in the strongest terms, and begged the Egyptian Government to reconsider its decision, and to endeavour to find some alternative scheme by which the country might reap the advantages to be derived from a storage reservoir, without sacrificing the interests of science and archæology.

The Ministry of Public Works, recognising that these protests were founded upon reasons so strong as to command respect, reconsidered the whole matter in detail, and endeavoured to find such modifications of the original scheme as might reconcile the interests of Egypt and of science.

The result of its studies is the modified project which has now been submitted to the Egyptian Government.

* * * * *

The modified scheme as at present submitted is of the nature of a compromise; it is hoped that it will satisfy the scientific world, while, at the same time, it will further the interests of this country.

It is now proposed to build a dam at Assuan with its crest at R.L. 106·00, or eight metres (26 ft.) lower than that of the original project. This work will of necessity store very much less water than the high-level dam would have done. At the same time a reservoir of this height will supply sufficient water for the wants of either Middle or Lower Egypt separately, although not for their combined areas.

This will mean that the reclamation of the country will proceed more slowly than was at first proposed; and when in course of time the country to the south has been explored a second dam can be made which will store sufficient water for the needs of the rest of Egypt.

This proposal is no new one, but has been fully discussed and estimated for in Mr. Willcocks's report upon the different sites.

The great advantage to be derived from carrying out the work in the above manner is that it will only submerge portions of the Philæ island, while it will leave the rest of the Nubian monuments untouched. A reference to Mr. Somers Clarke's note upon these latter will show that their levels are all well above that of the highest water surface in the modified project as now submitted.

As regards the Philæ temples, the main buildings will be above high-water level altogether. It is true that the South Quay wall, and some of the smaller temples, would be submerged if left unprotected. It will, however, be possible, by the construction of a low water-tight wall, or by other means, to so arrange for their protection that no damage will be done to them by the water.

To a certain extent the artistic beauty of the group will be impaired, but in a land so full of interesting relics as is Egypt, it is unfortunately impossible to carry out any great public work without in some degree interfering with some one or other of these. The only thing to be done is to try and minimise this interference as far as is possible, and in the present case the Ministry of Public Works thinks that it has succeeded in so doing.

As regards the details of the protection works to be carried out upon the Philæ island this Ministry will consult the scientific societies upon every point, and will endeavour, as far as lies in its power, to meet their wishes in the matter.

In order to still further minimise any possible loss to science which might ensue from the construction of the reservoir, it is proposed to carry out an archæological and scientific investigation of the whole of Nubia.

The English societies very rightly impressed the necessity of this work upon the Egyptian Government. The latter, although both willing and anxious to carry it out, found it impossible to do so, owing to the necessary funds not being available. If, however, the reservoir be made this difficulty at once disappears, as the cost of the above investigation will be added to the estimate of the dam itself.

The Public Works Department has been directed to put in hand as much of the work as lies within its scope and power during the ensuing winter season. Topographical surveys will be made and plans prepared; the true bearings of the temples will be fixed and the preliminary plans of all sites completed.

This portion of the work being done, the Egyptian Government will ask the European scientific societies to depute certain of their members to come to Egypt and complete the work.

In this manner it is hoped that a record and a knowledge will be obtained of this most interesting country which will be worthy of the present age, and which should be of the greatest value to the scientific world in the future.

NOTES.

WHERE the good of science is concerned, the Goldsmiths' Company is generally among the leading benefactors. With characteristic generosity, the Company has decided to make a grant of one thousand pounds for the purpose of prosecuting research work in connection with the anti-toxin treatment of diphtheria, and in aid of the manufacture of the serum. At the request of the Company, the Laboratories' Committee of the Royal College of Physicians and Surgeons have undertaken the administration of the grant.

REUTER'S correspondent at Rome reports that at a quarter past six on the morning of Tuesday, November 27, an earthquake occurred at Brescia, in Lombardy. The shock was followed by subterranean rumblings. A similar, though less violent, movement was felt at Bologna at nine minutes past six. Five minutes earlier a sharp disturbance occurred at Vienna, lasting four seconds. It was followed almost immediately by a second slighter shock of two seconds' duration. Shocks were experienced about the same time at Domodossola, Mantua, Pavia, Parma, and Bergamo, while at Rome the seismic instruments gave evidence of disturbance.

The Société Internationale des Électriciens established a central laboratory at Paris about seven years ago. The principal object of the laboratory was the preservation of electrical standards, and to afford practical electricians an opportunity for testing their various instruments. It is evident that such a laboratory offers special advantages for the investigation of questions belonging to the science and industry of electricity. These facilities have been to some extent utilised; but in order to increase the usefulness of the institution, the Society has added to it a School of Applied Electricity. This school, which will be opened on December 3, has been constructed on a plot of land granted by the city of Paris, the funds for the building having been raised by private subscription. Purely practical instruction will be given at the school. There will be two chief courses, one dealing with the industrial applications of electricity, and the other with electrometry. It is hoped that the school will be a training ground for higher work in the Central Laboratory, to which it is attached.

A Russian ethnographic exhibition will be held next year in the Champ de Mars, Paris.

The University of Chicago is establishing a special department of botany, with Prof. J. M. Coulter at its head.

It is announced that the printing of the important and laborious "Index Kewensis" will probably be completed about Midsummer 1895.

The death has recently occurred of Dr. L. Schwarz, the Director of Dorpat Observatory, and the Professor of Astronomy in the University there.

The resolutions passed by Convocation at Oxford, last summer, in favour of conferring degrees upon persons who have pursued a course of special study or research in the University, were submitted to a Congregation on Tuesday, and, after some discussion, the preamble was carried by a majority of sixty-nine votes.

A Dalziel telegram from Halifax, Nova Scotia, dated November 27, says: "It is reported that the steamer *Falcon*, of the Peary Arctic Exploration Expedition, was wrecked on the Virgin rocks, some distance off the southern coast of Greenland in October, and that all on board perished."

The Royal Botanical Society of Belgium has established a Committee of Vegetable Pathology, holding its sittings in the Botanic Garden at Brussels, for the purpose of affording information to nurserymen, horticulturists, and arboriculturists, respecting the diseases which attack plants, and the best mode of combating them.

In January last, attention was drawn to the fact that a sale of seven lions had taken place at the gardens of the Royal Zoological Society of Ireland, of which number six were born in Ireland. A further batch of five cubs, all males, has recently been disposed of by the Council, after a protracted correspondence. The total exchange value for these twelve lions exceeds, we understand, £500.

Agricultural Associations seem to be waking up to the necessity for the scientific investigation of diseases and pests affecting crops. One of the resolutions passed at a largely-attended conference of agricultural societies of New Zealand held during the past summer, was—"That the services of a first-class entomologist be obtained by Government, who shall give his whole time to an examination of insect pests, with a view to their destruction." It was also resolved to request the Government to get expert opinions as to the best method of exterminating the grub in corn and grass crops.

The promotion of an intellectual observance of Sunday is the object of the Sunday Society. At present the Society numbers among its chief aims the opening of the Natural History Museum and the South Kensington Museum on Sundays, so that the scientific collections of the nation shall enlighten a wider public. In furtherance of the general principle involved, a number of special sermons will be delivered next Sunday, this being the Society's third annual Museum Sunday; and several science and art collections will be open to members of the Society.

Near Dunkeld Cathedral, in the Duke of Athole's grounds, are two of the original five larch trees said to be the first introduced into this country. They were planted in 1738, and in the year 1888 they were measured with the following results:

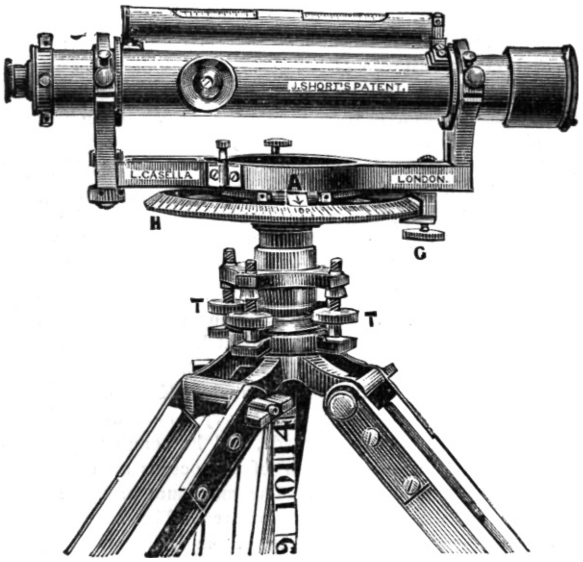
Height	102 ft. 4 in.
Circumference:	
3 ft. from ground	17 ft. 2 in.
5 ft. ,, ,,	15 ft. 1 in.
17 ft. ,, ,,	12 ft. 10½ in.
51 ft. ,, ,,	8 ft. 8 in.
68 ft. ,, ,,	6 ft. 1 in.

Mr. Walter B. Harris gave an account of his recent journey to Tafilet, at the last meeting of the Royal Geographical Society. He left Morocco city on November 1, 1893, in disguise, and crossed the Atlas at an elevation of a little over 8000 feet. In connection with this, it is worth noting that the *Bulletin* of the Paris Geographical Society (vol. xv. p. 199) contains a description, by M. Gabriel Delbrel, of a visit he paid to Tafilet last year.

Dr. Karl Karstens, of Kiel, has made a critical revision of the various estimates of the average depth of the oceans, as arrived at by the methods of different calculators. These methods he classes as of three kinds: that of measuring areas by the planimeter on a contoured map, that of calculating the areas of successive profiles drawn at intervals of 5° of latitude apart, and that of taking the mean depth of the soundings in definite small areas, and combining these to give the mean depth of the whole. Murray and Penck had made calculations by variations of the first method, and got out the mean depth of the oceans as 3797 metres (2074 fathoms) and 3650 metres (1995 fathoms) respectively; Heiderich, by the second method, got 3438 metres (1881 fathoms); and Krümmel, by the third method, gave the figure 3320 metres (1815 fathoms). Since Krümmel's calculations were made in 1886, his student Karstens has gone over them, taking advantage of the very numerous additional soundings which have been made, and he comes to the conclusion that the average depth of the oceans as a whole is 3496 metres, or 1909 fathoms. The maximum probable value was 3632, and the minimum 3377 metres. The mean depth of the Pacific Ocean is given as 3829, of the Indian Ocean 3593, and of the Atlantic 3160 metres.

Herr P. Dinse published the first part of a discussion of the geographical characteristics of fjords in a recent number of the *Zeitschrift* of the Berlin Geographical Society (vol. xxix. p. 189). This instalment deals with the morphology of fjord-riven coasts, a subsequent paper being intended to treat of the theory of the origin of fjords. The author distinguishes between *fjords* or inlets running into steep coasts, and sometimes branching, including one or more basins deeper than the sea immediately outside, and *fjord-channels* or sounds which are similar but open at both ends, and *fjord-lakes* which are similar but closed at both ends, and separated from the sea. A farther distinction is drawn between the different kinds of inlet which superficially resemble fjords, the most contrasted in submarine configuration being the *rias* of Spain and other coasts, in which the depth of the water gradually increases from the head until it merges in the general deepening of the sea outside. The inlets of the south-west of Ireland are examples of this type, contrasting with the characteristic fjords of the north-west of Ireland, the west of Scotland, and Norway. The greater part of the paper is occupied by an account of the distribution of the varieties of fjord-coasts in different parts of the world, and the generalisation is made that there are none of those coast-features outside the limits of lands which bear signs of recent glaciation. Herr Dinse has made a complete discussion of the principal dimensions and the exact configuration of eighty-three fjords in all parts of the world, taking his data from the largest-scale sea-charts available for each region, and these figures are printed as an appendix. The paper is illustrated by a few contoured maps of fjords, and by profiles showing their longitudinal and transverse sections.

THE Gradient-Telemeter Level, of which we give an illustration, should be of service to civil engineers and surveyors. Its novelty consists in the absence of a vertical circle, while a circle tilted out of the horizontal plane takes the place of the horizontal circle in an ordinary theodolite. So constructed, the instrument can be used to obtain linear distances, gradients, and differences in level of objects without the use of land-chain or tape. The circle is divided into natural tangents instead of degrees. When the reading is zero, the telescope is horizontal, but by rotating the circle, the telescope is inclined to the horizontal line, and the inclination is indicated by the pointer to the circle. As an example of the use of the instrument, suppose the whole of the levelling staff to be below the horizontal line of sight. Setting the circle for a gradient of one in twenty-five, let the reading of the staff be 13·86. Now set the circle so that the index points to a gradient of one in twenty, and let the reading be 8·45. The difference between these two readings is 5·41, and, eliminating the decimal point, the number obtained—541—is the horizontal distance in feet between the instrument and the staff, without any further calculation. Other pairs of gradients may be used, and the difference of their staff-readings gives the linear horizontal distance. The instrument thus greatly simplifies many surveying operations.



A COLLECTION of valuable notes on the aborigines of various parts of Australia is given in the November *Journal* of the Anthropological Institute. The notes, which take the form of answers to questions on the manners, customs, religions, superstitions, &c., of the native tribes of Australia, have been collected by Dr. E. C. Stirling. The natives are divided into innumerable tribes, and different customs prevail every two hundred miles or so. Arithmetic is beyond their comprehension. Most of the tribes appear to have distinctive names for one and two, but for three they say two and one; for four, they say two and two; and for five, two two and one. The fingers are used in counting, but numbers beyond five are very seldom used. Numbers greater than ten are usually described as "plenty" and "many," and explained by opening and closing the hands several times. The tribes have a very limited knowledge of the measurement of time. They tell the time of day by the sun, and speak of the different times of the position of the sun. They reckon by so many moons, and determine the year by the seasons; but they have no knowledge of the constellations, nor have they any names for the months, or moons, as they call them, or any recognised beginning of the year, nor artificial timekeeper of the nature of sun-dials, though the lengths of the shadows of trees is used by some tribes to determine the time of day. The heavenly bodies are not worshipped, neither are any ceremonies performed at the new moon, sunrise, sunset, the solstices, equinoxes, &c. The Milky Way is supposed to be the largest creek or river. A fresh sun is believed to shine every day, and the phases of the moon are explained by the prevailing course of the wind and prevailing quarter of the rain. Eclipses, rain, thunder, lightning, rainbows, wind, and Aurora Australis are supposed to be the work of evil spirits. Many other beliefs are described in the notes, which will be read with great interest by every student of anthropology and folk-lore.

THE mutual alterations effected between an invading igneous mass and the rock which it invades, have long been the subject of much study and speculation. An interesting case, presenting some exceptional features, has recently been described by Prof. Cole (*Trans. Roy. Dublin Soc.* vol. v. (n.s.) No. 5). On the coast of Co. Down, the Ordovician strata are cut by numerous basic dykes. In some cases, material of more acid composition has intruded at a later date, and, forcing its way along the same lines of weakness as the earlier basic material, has produced "compound" dykes. It is one such compound dyke, at Glasdrumman, consisting of basaltic andesite rifted lengthwise by later eurite, that Prof. Cole describes in detail. The new-comer has re-melted the more easily fusible andesite, and the two magmas have mixed along the contact. Various stages of mixture are described, but the most interesting facts are those concerning the large crystals of quartz and felspar which abound in the marginal portions of the eurite. These crystals have evidently consolidated under other, and earlier, conditions than the main mass of the rock, since portions of the eurite-matrix have eaten their way into them before solidifying. But crystals undoubtedly so corroded are also found in the andesite, into which they must have floated from the eurite. The presence in a rock of crystals of evident foreign origin is no new thing, but hitherto it has, in all such cases, been either shown or assumed that they were caught up by the rock in which they are found from some other into which it had intruded; whereas, here, it is the invading eurite that has parted with its crystals for the benefit of its host. Thus the common dictum, that "an enclosed block must be older than the rock immediately enclosing it," is apparently controverted; yet, since consolidation is the datum from which age is measured, it becomes a decidedly nice point in geological nomenclature whether a partially re-fused rock can be allowed to pass as entirely older than the rock which has re-melted it.

SOME interesting particulars concerning "aventurine glass," one of the most curious products of the world-renowned glass-works at Murano, near Venice, are given in the current number of the *American Journal of Science*, by Mr. Henry S. Washington. Its name is derived from its supposed discovery "by chance," some brass filings having been dropped accidentally into a pot of molten glass. After the late Dr. Salviati's revival of the glass industry at Murano it was rediscovered, but the present process is a trade secret. The best glass is of a copper-brown colour, and transparent to translucent in thin flakes, showing on the edges a pale brown colour. It is filled with innumerable small flakes and spangles of a slightly brownish yellow colour and brilliant metallic lustre, consisting of crystallised copper. Under the microscope the glass shows a porphyritic structure, the ground-mass being composed of a perfectly clear and colourless glass basis. The crystallised portions consist of large phenocrysts, small phenocrysts, and microlites. The former range in diameter from 0·05 to 0·12 mm., are tubular and extremely thin, the thickness scarcely exceeding 0·002 mm., and are perfectly opaque notwithstanding their excessive tenuity. Most of them are hexagonal in outline, the hexagons being of almost ideal symmetry; but equilateral triangles, which occasionally show truncated angles, also occur. The smaller phenocrysts are much more diverse in crystalline form, and may be generally grouped in one of three divisions: cubo-octahedral forms, octahedra, and twins. They occur in portions of the glass free from the larger phenocrysts, but filled with abundant microlites, from which they are usually separated by a clear zone. The copper has evidently crystallised out from solution in the molten glass exactly like a salt from water, following Lehmann's laws of crystal growth in solutions. Mr. Washington is of the opinion that the glass is produced by melting together glass, cuprous oxide, and some reducing agent, such as siderite; and that FeO is in this case the reducing agent is shown by the greenish colour of the imperfect glass, which is not the blue green of copper, but the yellow green of ferrous glass, and perhaps due to too large a quantity of reducing agent.

AT the last meeting of the French Physical Society, MM. Cailletet and Colardeau read a very interesting paper on the condensation of the gases produced by electrolysis on electrodes formed of metals of the platinum group. It is well known that when acidulated water is electrolysed by means of platinum electrodes that, on removing the battery and connecting the electrodes, a current is obtained in the opposite direction to the original current used to perform the electrolysis. This current, which only lasts for a short time, is explained by the recombination of the hydrogen and oxygen which coat the platinum electrodes. The authors, taking advantage of the well-known property of finely-divided platinum of occluding gas in large quantity, were led to use masses of finely-divided platinum contained in silk bags as electrodes, and in this way, using electrodes weighing six grms. each, a current was obtained, after disconnecting the battery, which continued for some time, and was of sufficient strength to ring an electric bell. By enclosing this form of the cell in a receiver, and compressing the air within the receiver, the following results were obtained:—With an additional pressure of one atmosphere, the E.M.F. immediately after charging was 1·8 volts, which fell regularly to zero when the cell was discharged. On increasing the pressure the character of the discharge-curve obtained entirely alters, and consists of three parts. (1) A portion in which the intensity of the discharge current rapidly diminishes. (2) A portion during which the current remains constant. This period occupies the major part of the time occupied in the discharge, and the E.M.F. at this time is about one volt. (3) A second period in which the current diminishes and finally becomes zero. The capacity of such an accumulator, the weight of the two electrodes being 1 kilogram, is, under a pressure of 580 atmospheres, 56 ampere-hours, while a current of 100 amperes can be obtained. To obtain the best possible result, the negative electrode should contain three times the weight of platinum in the positive electrode. With finely-divided palladium a storage capacity of 176 ampere-hours per kilogram of palladium was obtained at a pressure of 600 atmospheres. It is interesting to note that the storage capacity of an ordinary lead accumulator is about 15 ampere-hours per kilo of metal.

LEON GUIGNARD, in the *Journal de Botanique*, adds another important contribution to our knowledge of the centrospheres of plant-nuclei, entitled "Sur l'origine des sphères directrices." It will be remembered that this author was the first to demonstrate the existence of these structures in vegetable cells (*Comptes-rendus*, 1891), and also, in a later paper, to describe their behaviour during the origin of the sexual cells and the part they take in the phenomena of fertilisation (*Ann. des Sc. Nat.* 1891). In these earlier works Guignard already figured many resting nuclei with the centrospheres lying outside the nuclear membrane, and usually in close proximity to it, while within the nuclear membrane are to be seen one or more nucleoli. Strasburger also observed and figured centrospheres outside resting nuclei in *Sphacelaria scoparia* (*Hist. Beiträge*, iv. p. 52). Recently, however, G. Karsten was led to believe, from a study of the relations of the nucleoli and centrosomes in the mother cells of the spores of *Psilotum triquetrum* that the centrosomes (or minute bodies included in the centrospheres) owe their origin to the nucleoli, and after karyokinesis are re-included as nucleoli in the daughter nuclei. Guignard's last paper is chiefly concerned with an examination of this point, and he comes to the conclusion that prior to karyokinesis the centrospheres in the cells of the sporangia of *P. triquetrum* are external to the nuclear membrane, and that after karyokinesis, while some of the small nucleoli which have not disappeared during the division of the nucleus are re-included within the nuclear membranes of the daughter nuclei, they remain external to them.

A RECENT number of the *Minnesota Botanical Studies* contains a bibliography on the subject of the fixation of free nitrogen by plants, embracing over 600 titles.

THE report of the fifth meeting of the Australasian Association for the Advancement of Science, held at Adelaide, in September 1893, has just reached us from Sydney, where the permanent office of the Association is situated.

MESSRS. RIVINGTON, PERCIVAL, AND CO. have published a third edition of "Practical Inorganic Chemistry," by Mr E. J. Cox. The book is intended for students preparing for the elementary practical chemistry examination of the Department of Science and Art.

IN the form of "Bulletin No. 56," Mr. P. H. Mell, the State Botanist for Alabama, records the result of a series of observations on the crossing of different varieties of the cotton-plant at the Agricultural Experiment Station at Auburn. The plant is pollinated by the agency of the wind and of insects, and he finds inter-crossing to have a material effect in increasing the strength of the fibre.

MISS ORMEROD will issue in a few days an abstract of information on the history and habits of that seriously destructive cattle-pest, the Warble Fly or Ox Bot Fly. The description will be very fully illustrated, and will be an epitome of the knowledge and experience gained up to the present time, and especially during the years 1884 to 1894. It will deal practically with means of prevention and remedy. The publishers are Messrs. Simpkin, Marshall, Hamilton, Kent, and Co.

AN "Artificial Spectrum Top," devised by Mr. C. E. Benham, and sold by Messrs. Newton and Co., furnishes an interesting phenomenon to students of physiological optics. The top consists of a disc, one half of which is black, while the other half has twelve arcs of concentric circles drawn upon it. Each arc subtends an angle of forty-five degrees. In the first quadrant there are three such concentric arcs, in the next three more, and so on; the only difference being that the arcs are parts of circles of which the radii increase in arithmetical progression. Each quadrant thus contains a group of arcs differing in length from those of the other quadrants. The curious point is that when this disc is revolved, the impression of concentric circles of different colours is produced upon the retina. If the direction of rotation is reversed, the order of these tints is also reversed. The cause of these appearances does not appear to have been exactly worked out.

The additions to the Zoological Society's Gardens during the past week include a Black Lemur (*Lemur macaco*, ♂) from Madagascar, presented by Mr. Roche; a Snowy Owl (*Nyctea scandiaca*), captured in mid-Atlantic, 700 miles from land, presented by Mr. Harston Eagle: two Levaillant's Cynictis (*Cynictis levaillanti*), two Domestic Sheep (*Ovis aries*, var.), two Puff Adders (*Vipera arietans*), a Cape Bucephalus (*Bucephalus capensis*), six Hispid Lizards (*Agama hispida*), five Rough-scaled Lizards (*Zonurus corydlus*), a Delalande's Lizard (*Nucras delalandi*), a Crossed Snake (*Psammophis crucifer*) from South Africa, two Bennett's Tree Kangaroos (*Dendrolagus bennethanus*) from North Queensland; an Allied Goshawk (*Astur approximans*), three Long-necked Chelodines (*Chelodina longicollis*), twenty-two Golden Tree Frogs (*Hyla aurea*), seventeen White's Tree Frogs (*Hyla cærula*) from Australia, a Spix's Macaw (*Ara spixi*) from North Brazil, deposited; two Caroline Conures (*Conurus carolinensis*) from North America, purchased; two Queensland Tree Kangaroos (*Dendrolagus lumholtzi*, ♂ ♀) from Queensland; four Brush Turkeys (*Talegalla lathami*, 4 ♂) from Australia, received in exchange.

OUR ASTRONOMICAL COLUMN.

The Parallax of Nebula *h* 2241.—At the time when Dr. Wilsing took photographs of the nebula B.D. + 41°·4004 for the determination of parallax, he obtained also a series of negatives of B.D. + 41°·4773 (*h* 2241) for the same purpose. This nebula is almost ring-shaped, and displays a central condensation. The latter appears more distinct on the photographic plates than can be seen by eye observations, and its contour is only sufficiently sharp for micrometric measurements on the best plates, so that the centre of the whole apparent disc has been generally used. From June 1892 to August of the following year, 33 plates were obtained, 31 of which have been used in this research. Six comparison stars, the positions of which were taken from the Bonn zones, have been adopted. In the account of the result obtained (*Astro. Nach.* No. 3261), Dr. Wilsing gives a table showing the deduced distances of the nebula from the two comparison stars 3 and 6. A second table contains the mean monthly values of these distances with their differences from the whole *mean* value obtained from all the measurements, together with the most probable errors of the measurements.

The following table shows these differences between the total and monthly means for the two stars 3 and 6:

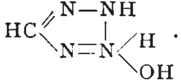
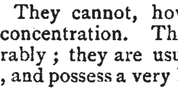
	[N, 3]	[N, 6]	Prob. error.	No. of plates.
	"	"	"	
1892 June 21 ...	−0·03 ...	+0·28 ...	±0·08 ...	5
July 13 ...	+0·11 ...	+0·03 ...	0·06 ...	9
Aug. 9 ...	+0·07 ...	−0·04 ...	0·13 ...	2
Sept. 25 ...	+0·01 ...	−0·06 ...	0·08 ...	5
Oct. 4 ...	−0·13 ...	+0·01 ...	0·13 ...	2
Nov. 8 ...	+0·20 ...	+0·03 ...	0·10 ...	3
Dec. 22 ...	−0·53 ...	−0·44 ..	0·18 ...	1
1893 Feb. 4 ...	−0·13 ...	−0·34 ...	0·18 ...	1
July ...	−0·08 ...	−0·19 ...	0·13 ...	2
Aug. ...	−0·53 ...	−0·14 ...	0·18 ...	1

These differences, when considered in relation with the probable errors of the measurements, have as Dr. Wilsing suggests, to be cautiously dealt with, and he is led to conclude from this series of measures that the relative parallax of this nebula does not exceed one or two tenths of a second of arc.

A Possible New Zone of Asteroids.—The secular variations of the orbits of the four inner planets has lately occupied Prof. Newcomb's attention, with the result that several elements have been found to vary in a manner unaccounted for by existing theory. (*Astronomical Journal*, No. 327.) "These anomalies," says Prof. Newcomb, "cannot be simultaneously explained either by an intra-mercurial zone of planets, by the action of matter reflecting the zodiacal light, or by a deviation of gravitation from the usually accepted law. The uncertainty as to the mass of Mercury makes the construction even of a working hypothesis difficult; but apart from all considerations of probabilities, *à priori*, the hypothesis which best represents observations, is that of a ring of planetoids of small eccentricity a little outside the orbit of Mercury, and a little more inclined to the ecliptic. The total mass of the ring may range from one-fiftieth to, perhaps, one three-hundredth of the mass of Venus, according to its distance from Mercury." Prof. Newcomb intends to carefully investigate the matter in order "to decide whether the results of the hypothesis are such as to counterbalance its extreme improbability."

A New Comet.—*Edinburgh Circular*, No. 43, dated November 23, states that a telegram received from the Central Astronomical Station at Kiel announces the discovery of a very faint comet, by Mr. Edward Swift, at 8 p.m., Californian time, on the 20th inst. It was situated in Right Ascension, 22h. 18m. 24s., and South Declination, 13° 7', and was moving slowly towards the east.

A NEW SERIES OF NITROGEN COMPOUNDS.

ANOTHER new series of nitrogen compounds, containing four atoms of that element along with one atom of carbon in a closed chain, are described by Prof. v. Pechmann and Herr Runge in the current *Berichte*. They are termed "tetrazolium" compounds, and the parent base of the series is tetrazolium hydroxide, whose constitution is represented by the formula  $\mathrm{HC}\Big\langle\begin{array}{l}\mathrm{N-NH}\\ \quad\ \ |\\ \mathrm{N{=}N}\Big\langle\begin{array}{l}\mathrm{H}\\ \mathrm{OH}\end{array}\end{array}$. The fundamental base itself has not yet been isolated; the compounds prepared comprise the derivative in which the two hydrogen atoms directly attached to the two end nitrogen atoms are replaced by phenyl, together with a large number of salts of this base, formed by replacement of the hydroxyl by halogens or other acid radicles just as in the case of metallic hydroxides. The hydrogen atom attached to the carbon is likewise capable of replacement by many organic radicles, so that a large number of still more complicated bases have likewise been prepared, together with their corresponding salts. The hydroxides of this new series are characterised by possessing strong basic properties. They may all be prepared most conveniently from their chlorides, by the action upon them of silver oxide. They are extremely soluble in water, but are completely precipitated from their solutions by ether. The aqueous solutions absorb carbon dioxide and behave very much like caustic alkalies. They cannot, however, be crystallised, forming resins upon concentration. The salts, on the other hand, crystallise admirably; they are usually soluble in water, react neutral to litmus, and possess a very bitter taste. Diphenyl tetrazolium chloride,  $\mathrm{HC}\Big\langle\begin{array}{l}\mathrm{N-NPh}\\ \quad\ \ |\\ \mathrm{N{=}N}\Big\langle\begin{array}{l}\mathrm{Ph}\\ \mathrm{Cl}\end{array}\end{array}$, which may be taken as a typical salt of the series, crystallises in colourless radiating groups of needles very sensitive to light, which renders them yellow. The aqueous solution yields a flesh-coloured precipitate of a chloroplatinate with platinum chloride, and the double salt may be crystallised from hot water. A crystalline double chloride is likewise produced with gold chloride. The addition of a soluble nitrate or iodide causes the precipitation of the difficultly soluble nitrate or iodide of the base. A solution of iodine in potassium iodide precipitates an iodine addition product, which can be crystallised from alcohol in beautiful brown tabular crystals exhibiting a violet reflection. The parent base is produced in solution upon the addition of silver oxide, silver